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FAX Transmission Sheet

March 21, 2003

To: Song, M. Fax No.: (703) 872-9311
From: Stephen P. Burr Fax No.: (315) 233-8320
Re: U.S. Patent Application Serial No. 09/854,924
Title: PROCESS AND APPARATUS FOR PRODUCING AN
OXIDE SINGLE CRYSTAL
Conf. No.: 7936
Our Ref.: 782_163

You should receive 6 page(s) including this cover sheet. If you do not receive all pages, please call Tara at (315) 233-8300.

COMMENTS:

I hereby certify that the following paper(s) is/are being transmitted by facsimile to the Patent and Trademark Office on March 21, 2003:

- Transmittal form (in duplicate)
- Request for Reconsideration (3 pages)

Tara L. Preston

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PATENT TRANSMITTAL

(Provisions of 37 CFR 1.136 Apply)

Application Number	09/854,924	Filing Date	May 14, 2001
Group Art Unit	1765	Examiner Name	Song, M.
Confirmation No.	7936	Attorney Docket No.	782_163
Inventor(s)	Toshihisa YOKOYAMA, Ken-ichi NODA, Katsuhiro IMAI and Minoru IMAEDA		
Invention:	PROCESS AND APPARATUS FOR PRODUCING AN OXIDE SINGLE CRYSTAL		

Transmitted herewith is a Request for Reconsideration in the above-identified application. The fee has been calculated as follows:

CLAIMS AS AMENDED

(1)	(2) Claims Remaining	(3)	(4) Highest Number Previously Paid	(5) No. of Extra Claims Present	(6) Rate (Large Entity)	(7) Additional Fee
TOTAL CLAIMS	9	MINUS	26	0	\$18.00	\$00.00
INDEP. CLAIMS	1	MINUS	3	0	\$84.00	\$00.00
TOTAL ADDITIONAL FEE						\$00.00

EXTENSION OF TERM

- ☒ Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition for extension of time.
- ☐ This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application. The requested extension and appropriate non-small entity fee are as follows:

- ☐ One Month (37 CFR 1.17(a)(1)) \$110.00
- ☐ Two Month (37 CFR 1.17(a)(2)) \$410.00
- ☐ Three Month (37 CFR 1.17(a)(3)) \$930.00

TOTAL FEES DUE

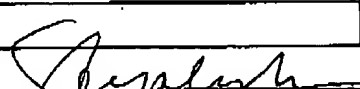
\$ 0.00

- ☐ Applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee amount is reduced by one-half, and the resulting fee is:

FEE PAYMENT

- ☒ No additional fee is required.
- ☐ A check in the amount of \$_____ is enclosed.
- ☐ Charge Deposit Account 50-1446 in the amount of \$. Enclosed is a duplicate copy of this sheet.
- ☒ Please charge any fees which may be required, or credit any overpayment, to Deposit Account 50-1446.

Submitted By:

Name (Print Type)	Stephen P. Burr	Reg. No.	32,402	Customer No.	025191
		Telephone	(315) 233-8300	Facsimile	(315) 233-8320
Signature				Date	March 21, 2003

CERTIFICATION OF FACSIMILE TRANSMISSION

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Tara L. Preston

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Practitioner's Docket No.: 782_163

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of: Toshihisa YOKOYAMA, Ken-ichi NODA, Katsuhiko IMAI
and Minoru IMAEDA

Ser. No.: 09/854,924

Group Art Unit: 1765

Filed: May 14, 2001

Examiner: Song, M.

Confirmation No.: 7936

For: PROCESS AND APPARATUS FOR PRODUCING AN OXIDE SINGLE
CRYSTAL

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Assistant Commissioner for Patents
Washington, DC 20231

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TRANSMISSION

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on March 21, 2003 at (703) 872-9311.

Tara L. Preston
Tara L. Preston

REQUEST FOR RECONSIDERATION

Sir:

The following remarks are in response to the Final Office Action mailed January 15, 2003.

1. Claims 1-9 were rejected under §103(a) over Imaeda et al. (assigned to the same assignee of the present application) in view Ciszek et al. This rejection is respectfully traversed.

The PTO contends that "the Imaeda reference teaches [that] a high temperature gradient is not desirable **after** growing the single crystal..., while the Ciszek reference teaches cooling a **growing** body's interface" (see last sentence on page 4 of the Office Action). The PTO is apparently arguing that skilled artisans would have been motivated to employ Ciszek's step of blowing a cooling medium onto the liquid-solid crystal interface of an oxide single crystal grown using Imaeda's method. Applicants respectfully disagree.

The PTO is correct in that Ciszek does not teach controlling a temperature gradient "after growing the single crystal," as disclosed in Imaeda. Imaeda teaches maintaining an optimum temperature range (using a heater) after the growth of the crystal to prevent a rapid change in the temperature of the oxide single crystal. This optimum temperature range, Imaeda discloses, ensures that sufficient crystallinity of the oxide single crystals can be achieved by reducing thermal stresses that act upon the crystals and cause cracks in the oxide

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single crystals (see column 8, lines 1-6 of Imaeda). Ciszek, on the other hand, discloses blowing a cooling medium directly onto the liquid-solid crystal interface while growing a silicon crystalline body.

One skilled in the art would readily understand that the temperature at the liquid-solid crystal interface is higher than the temperature of the grown crystal body. Accordingly, a cooling medium blown directly onto the liquid-solid crystal interface portion would necessarily produce a more rapid change in the temperature of the liquid-solid crystal interface than would be realized if the same cooling medium were blown on the grown crystal body. Therefore, since Imaeda explicitly teaches that such a high temperature gradient is undesirable in the region of the cooler grown crystal body (because thermal stresses acting upon the crystals result in the deterioration of the crystallinity of the oxide single crystals), then it logically follows that one skilled in the art would expect even a more undesirable effect at the hotter liquid-solid crystal interface.

Since Imaeda teaches that a low cooling rate is desirable after the oxide single crystal is grown, it logically follows that a low cooling rate should also be employed during crystal growth. Therefore, skilled artisans would not have been motivated to use Ciszek's step of blowing a cooling medium directly onto the liquid-solid crystal interface in Imaeda's method of forming oxide single crystals. Again, to do so would cause an even higher temperature gradient during the growth of the oxide single crystal. The §103(a) rejection should be withdrawn for this reason alone.

Furthermore, as mentioned above, Ciszek's disclosure pertains to forming a *silicon* crystalline body, while Imaeda discloses a method for producing oxide single crystals (as claimed). A silicon crystal has a higher coefficient of thermal conductivity and a lower coefficient of thermal expansion in comparison to an oxide single crystal. Thus, skilled artisans would not conclude that oxide single crystals could withstand the cooling treatment used in Ciszek, which is designed for silicon crystals. As such, benefits disclosed in Ciszek (i.e., wider crystal ribbons) would not necessarily result if Ciszek's step of blowing a coolant directly onto the liquid-solid crystal interface were employed in Imaeda's oxide single crystal growth method. Therefore, skilled artisans would not even look to Ciszek for guidance when growing oxide single crystals as disclosed in Imaeda (and as claimed).

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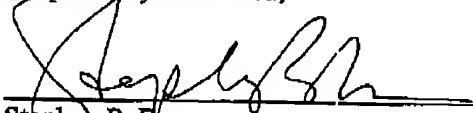
As explained above, Ciszek discloses cooling the *liquid-solid crystal interface* and does not disclose or suggest cooling the oxide single crystal (i.e., the grown crystal body), as claimed. Therefore, even if Ciszek and Imaeda were combined as asserted in the Office Action (Applicants submit that skilled artisans would not have been motivated to do this), there would be no step of "providing a cooling mechanism for directly cooling said *oxide single crystal*...", as recited in pending claim 1.

In view of the foregoing, reconsideration and withdrawal of the §103(a) rejection over Imaeda et al. in view of Ciszek et al. are respectfully requested.

If the Examiner believes that contact with Applicants' attorney would be advantageous toward the disposition of this case, the Examiner is herein requested to call Applicants' attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,


Stephen P. Burr
Reg. No. 32,402

March 21, 2003
Date

SPB/SC/tp

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